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DEC 03 2007

Application No.: 10/074,600

Filed: February 12, 2002

TC Art Unit: 2157

Confirmation No.: 4837

AMENDMENTS TO THE CLAIMS

1. (currently amended) A data communications network, comprising:

a plurality of data communications rings, the plurality of rings including a first ring, a second ring, and a third ring,

wherein at least the second ring is configured for spatial reuse;

at least one first node coupled to the first ring, the at least one first node including an a first end station, the first end station having an associated address;

at least one second node coupled to the second ring;

a first bridge configured to link the first ring to the second ring; and

a second bridge configured to link the second ring to the third ring,

wherein each of the first and second bridges has an associated identifier,

wherein the second bridge is operative:

(1) ~~to learn an association between the first bridge and the end station coupled to the first ring~~ to receive at least one packet, the at least one received packet including an ingress

Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

identifier, an egress identifier, and a source end station address;

to analyze the ingress identifier of the received packet to determine whether the ingress identifier corresponds to the first bridge identifier;

to analyze the source end station address of the received packet to determine whether the source end station address corresponds to the first end station address; and

in the event the ingress identifier and the source end station address of the received packet correspond to the first bridge identifier and the first end station address, respectively, to learn an association between the first bridge and the first end station coupled to the first ring, and,

(2) upon receiving a packet destined for the first end station:

(1) in the event the association between the first bridge and the first end station coupled to the first ring has not yet been learned, to forward, on the second ring, the received packet as a broadcast transmission between the second bridge and the first bridge in a manner indicating that the packet is to be examined by the first bridge and each of the at least one second node coupled to the second ring, in the event that the association between the

Application No.: 10/074,600

Filed: February 12, 2002

TC Art Unit: 2157

Confirmation No.: 4837

~~first bridge and the end station coupled to the first ring has not yet been learned, and~~

(ii) in the event the association between the first bridge and the first end station coupled to the first ring has been learned, to make the egress identifier of the received packet correspond to the first bridge identifier, to forward, on the second ring, the received packet as a unicast transmission from the second bridge to the first bridge, and to remove, at the first bridge, the received packet from the second ring to permit spatial reuse of the second ring, ~~in the event that the association between the first bridge and the end station coupled to the first ring has been learned.~~

2. (currently amended) A data communications network according to claim 1, wherein the first end station comprises an interworking bridge.

3. (previously presented) A data communications network according to claim 2, wherein the interworking bridge provides transparent LAN services via the second ring to customers connected to external LAN segments.

Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

4. (previously presented) A data communications network according to claim 1, wherein the second ring is a resilient packet ring.

5. (canceled)

6. (currently amended) A data communications network according to claim 1, ~~wherein the end station is a first end station, and~~ further comprising a second end station, the second end station having an associated address and being coupled to the third ring, and wherein the first bridge is operative (1) to learn an association between the second bridge and the second end station coupled to the third ring, and (2) upon receiving a packet destined for the second end station: (i) to forward, on the second ring, the received packet as a broadcast transmission between the first bridge and the second bridge in a manner indicating that the packet is to be examined by each of the at least one second node coupled to the second ring, in the event that the association between the second bridge and the second end station coupled to the third ring has not yet been learned, and (ii) to forward, on the second ring, the received packet as a unicast transmission from the first bridge to the second bridge, in the event that the

Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

association between the second bridge and the second end station coupled to the third ring has been learned.

7. (currently amended) A data communications network according to claim '6, wherein the first bridge learns the association between the second bridge and the second end station by monitoring the broadcast transmission of the second bridge on the second ring, the broadcast transmission of the second bridge including an identifier of the second bridge identifier identifying the second bridge as an ingress bridge and an address of the second end station address corresponding to an address of as a source of a message included in the broadcast transmission of the second bridge.

8. (previously presented) A data communications network according to claim 6, further comprising a third bridge, the third bridge being coupled to both the second and third rings as a backup to the second bridge, and wherein the second bridge is operative to send unicast update messages to the third bridge enabling the third bridge to keep track of the associations learned by the second bridge, and wherein the third bridge is operative upon failure of the second bridge to begin the learning

-6-

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Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

of associations and the forwarding of packets on the second ring as broadcast or unicast transmissions depending on whether the respective associations have been learned.

9. (currently amended) A method of operating a data communications network having ~~an~~ a first end station, a plurality of data communications rings including a first ring, a second ring, and a third ring, at least the second ring being configured for spatial reuse, the first end station having an associated address and being coupled to the first ring, at least one second node being coupled to the second ring, a first bridge for linking the first ring to the second ring, and a second bridge for linking the second ring to the third ring, each of the first and second bridges having an associated identifier, the method comprising the steps of:

at the second bridge,—:

receiving at least one packet, the at least one received packet including an ingress identifier, an egress identifier, and a source end station address;

analyzing the ingress identifier of the received packet to determine whether the ingress identifier corresponds to the first bridge identifier;

Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

analyzing the source end station address of the received packet to determine whether the source end station address corresponds to the first end station address;

in the event the ingress identifier and the source end station address of the received packet correspond to the first bridge identifier and the first end station address, respectively,  
learning an association between the first bridge and the first end station coupled to the first ring; and

~~at the second bridge, upon receiving a packet destined for the first end station:~~

~~(i) in a first forwarding step, in the event the association between the first bridge and the first end station coupled to the first ring has not yet been learned, forwarding, on the second ring, the received packet as a broadcast transmission between the second bridge and the first bridge in a manner indicating that the packet is to be examined by the first bridge and each of the at least one second node coupled to the second ring, in the event that the association between the first bridge and the end station coupled to the first ring has not yet been learned, ; and~~

~~(ii) in a second forwarding step, in the event the association between the first bridge and the end station coupled to the first ring has been learned, making the egress identifier~~

Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

of the received packet correspond to the first bridge identifier,  
forwarding, on the second ring, the received packet as a unicast  
transmission from the second bridge to the first bridge, and  
removing, at the first bridge, the received packet from the second  
ring to permit spatial reuse of the second ring, in the event that  
the association between the first bridge and the end station  
coupled to the first ring has been learned.

10. (currently amended) A method according to claim 9, wherein  
the first end station comprises an interworking bridge.

11. (previously presented) A method according to claim 10,  
wherein the interworking bridge provides transparent LAN services  
via the second ring to customers connected to external LAN  
segments.

12. (previously presented) A method according to claim 9, wherein  
the second ring is a resilient packet ring.

13. (canceled)



Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

14. (currently amended) A method according to claim 9, wherein ~~the end station is a first end station, and wherein the network~~ further includes a second end station, the second end station having an associated address and being coupled to the third ring, and further comprising:

at the first bridge, learning an association between the second bridge and the second end station coupled to the third ring; and

at the first bridge, upon receiving a packet destined for the second end station:

(i) in the event that the association between the second bridge and the second end station coupled to the third ring has not yet been learned, forwarding, on the second ring, the received packet as a broadcast transmission between the first bridge and the second bridge in a manner indicating that the packet is to be examined by each of the at least one second node coupled to the second ring; ~~in the event that the association between the second bridge and the second end station coupled to the third ring has not yet been learned, and~~

(ii) in the event that the association between the second bridge and the second end station coupled to the third ring has been learned, forwarding, on the second ring, the received packet

-10-

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Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

as a unicast transmission from the first bridge to the second bridge, ~~in the event that the association between the second bridge and the second end station coupled to the third ring has been learned.~~

15. (currently amended) A method according to claim 14, wherein the first bridge learns the association between the second bridge and the second end station by monitoring the broadcast transmission of the second bridge on the second ring, the broadcast transmission of the second bridge including an ~~identifier of the second bridge~~ identifier identifying the second bridge as an ingress bridge and an ~~address of the second end station~~ address corresponding to an address of ~~as a~~ source of a message included in the broadcast transmission of the second bridge.

16. (previously presented) A method according to claim 14, wherein the network further comprises a third bridge, the third bridge being coupled to both the second and third rings as a backup to the second bridge, and further comprising:

-11-

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Application No.: 10/074,600  
Filed: February 12, 2002  
TC Art Unit: 2157  
Confirmation No.: 4837

at the second bridge, sending unicast update messages to the third bridge enabling the third bridge to keep track of the associations learned by the second bridge; and

at the third bridge, upon failure of the second bridge, beginning the learning of associations and the forwarding of packets on the second ring as broadcast or unicast transmissions depending on whether the respective associations have been learned.

17-18. (canceled)